

CHILDREN'S VISION CONSERVATION

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CHILDREN'S VISION : THE

OHIO DEPARTMENT OF HEALTH CARES

Richard T. Bunner, B.S., M.A.

You have started to read this article because you are concerned about children's vision. The staff of the Ohio Department of Health shares that concern and expends a large amount of funds to deliver services that, directly or indirectly, bring eye care to children. This issue of Ohio's Health will identify and introduce you to an extensive network of children's vision care programs.

New Emphasis on Vision

The Hearing and Vision Conservation Unit of the Ohio Department of Health embarked on a new emphasis on vision in 1969. A consultant was hired to work solely in vision. The Department now employs two vision consultants, and plans for two more. These consultants help with statewide screening programs (training and testing) and in clinical services in forty-four counties. The Vision Advisory Committee to the Department was also formed in 1969. This inter-professional Committee is composed of representatives from public health, school health, special education, welfare,

rehabilitation, optometry, ophthalmology and volunteer organizations. The Department's *Policies Recommended for Vision Conservation Programs for Children* were formulated and approved by the Advisory Committee.

The major task of the Committee was to improve and expand screening recommendations that are, by State law, officially issued by the Ohio Department of Health. Prior to 1969, recommendations for vision screening stressed:

- 1) distance acuity testing with a Snellen chart; and

- 2) observation for signs and symptoms of eye problems.

Although such a testing program might do a satisfactory job, serious eye problems were still being missed. The Advisory Committee considered testing procedures for other eye problems that would be adaptable to a statewide screening effort.

The screening recommendations distributed by the Ohio Department of Health have been agreed upon by the entire committee. The tests now recommended are for:

- 1) distance visual acuity;

- 2) near visual acuity;
- 3) excessive farsightedness;
- 4) eye muscle imbalance;
- 5) color deficiency; and
- 6) observation for signs and symptoms of eye problems.

These tests have been used in various areas of the state, and the figures from a special screening project in Southeastern Ohio are typical. The following referrals were made on children who failed: 10% for distance acuity; 3% for excessive farsightedness; 2% for eye muscle imbalance; and $\frac{1}{2}\%$ for signs or symptoms. In areas testing for color deficiency, about 5% of the males and less than $\frac{1}{2}\%$ of the females have failed. Tests of near acuity have yielded few referrals among children. These figures should help others decide what tests to include in their screening programs.

The Advisory Committee made other recommendations. The Committee felt that stereoscopic screening machines, or those which simulate distance, should not be used on children below the third grade. A suggested minimum schedule of testing included all children in Kindergarten, Grades 1, 3, 5, 7 and 9, all new students and students referred by teachers. It was also recommended that the Department initiate the Diagnostic Ocular Pediatric (DOP) Clinics or children's eye clinics in

areas where a need was demonstrated. An important emphasis of the Committee's recommendations was encouraging the use of other testing procedures in addition to the Snellen chart test.

Training for Screening

Along with the emphasis on expanded screening, the Department stresses training programs for nurses, technicians and volunteers. To teach those engaged in screening how to implement additional procedures, the Hearing and Vision Conservation Unit presents workshops lasting from one-half day to two days. Included is instruction on eye anatomy, physiology, pathology, testing and practicum. Workshops can be offered anywhere in Ohio, with a preferred minimum attendance of five.

Preferred Testing Procedures

The following tests and procedures are demonstrated in training, but are not mandatory.

To test distance acuity, a lighted 20-foot Snellen chart using E's, pictures or letters, is recommended. Children under four years are referred for examination if, after a second screening, their acuity is 20/50 or poorer. (Normal vision is 20/20.) Children four and over are referred if they have 20/40 acuity or poorer. Minimum dis-

tance acuity testing is given to those in Kindergarten, grades 1, 3, 5, 7 and 9.

The test for excessive far-sightedness is administered by using +2.00 diopter lenses or hyperopia glasses in conjunction with the Snellen chart. If a child reads the 20/30 line on the chart with the glasses on, he is referred. Grade 1 or 3 should be tested. Separately or in addition the nurse may use a near visual acuity card, referring a child with 20/40 acuity.

The preferred tests for eye muscle imbalance ("crossed eyes" or the tendency toward "crossed eyes") are the penlight test or the alternate cover test. A screener should receive careful instruction before implementing muscle tests, which can be valuable screening tools and are inexpensive to administer. Grades 1 or 3 and 5 should be screened.

In testing for color deficiency, the screener should use color plate books in which a child determines the figure from the background. Color tests need be given only once, in an early elementary grade or junior high.

The Department is aware that children may also have problems of visual perception, or interpretation of what they see. Finding these children should not be a part of a public or school health screening conducted by a nurse or volunteer.

Screening tests for perceptual problems are available, and should be administered by the classroom teacher, learning disabilities teacher or school psychologist.

Inter-Agency Cooperation Screening Programs:

There are varied vision screening programs in Ohio, and coordination of activities at the local level is needed to limit duplication of services. The Ohio Department of Health has worked closely with local health departments and schools in organizing preschool and in-school screening. The Ohio Society for the Prevention of Blindness and other service organizations also conduct preschool screening. The Ohio Department of Education has recently initiated a vision screening effort for preschoolers in selected school systems.

Diagnostic and Treatment Programs:

Most parents who are financially able will take their child to an optometrist (vision specialist) or ophthalmologist (medical eye specialist) or to their family physician. Because of costs, some children receive no private care. The Bureau of Crippled Children's Services, Ohio Department of Health, offers funding for diagnostic vision evaluation for any child

referred by a public health department. The Hearing and Vision Conservation Unit offers its system of diagnostic clinics (DOP).

Beyond the diagnostic stage one must be concerned about care and treatment for children in need of assistance. Funding from the Bureau of Crippled Children's Services is available for the medical treatment of eye problems to families that qualify. Children whose families are covered by certain welfare programs may receive eye care. Various hospitals in Ohio, The Ohio State University's College of Optometry and the Colleges of Medicine in Cincinnati, Cleveland, Columbus and Toledo offer clinical service for children.

A longtime help to children in need of vision care has been that provided by local Lions Clubs, who also contribute heavily to eye research.



What Does The Department Offer?

If as a school nurse, public health nurse, teacher or parent, you are in need of assistance for vision services for children, look to the Ohio Department of Health. The members of the Hearing and Vision Conservation Unit believe sincerely in service to the public for tax dollars spent.

To summarize, the Department offers the following services:

- 1) training for vision screening;
- 2) clinical services;
- 3) printing and free distribution of screening forms;
- 4) distribution of vision literature;
- 5) public education speakers;
- 6) screening equipment loan;
- 7) possible funding for demonstration projects or research related to vision; and
- 8) consultation in all phases of vision conservation, including planning.

Please call upon us for help!

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About the Author. . .

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Vision Problems of Infants and Children

Richard E. Simmons, M.D.

If someone is said to have twenty-twenty (20/20) vision, that means he can see clearly at twenty feet what the normal eye sees at that distance.

At birth an infant sees about 20/670. If vision is to develop to the normal 20/20 at the age of six or seven years, several vital prerequisites must be met: (1) clear optical media, (2) normal retina and (3) proper focusing elements (cornea and lens).

Amblyopia

Amblyopia is poor visual acuity caused by an abnormal message being transmitted to the brain. The computer is thus programmed with faulty information. When amblyopia is not detected before age eight, treatment usually fails to improve the vision. If the ability to see forms (large objects) is not present in the first three or four months of life, the important fixation reflex does not develop. This failure produces the most severe (deprivation type) amblyopia, which will not respond to any therapy and produces legal blindness. A dense cataract is the most common cause of deprivation amblyopia. Since it is



not customary for a newborn to have an ophthalmological examination, other health care personnel must be utilized to help prevent this needless loss.

By the age of three months a baby should be able to fixate well with each eye on a flashlight or small toy. The examiner should note (a) the infant's eye for any lack of fixation (such as that seen with nystagmus, an involuntary rapid movement of the eyeball) and (b) any objection of the infant to having each eye alternately covered by the examiner's hand or appropriate occluder (I prefer my thumb or several fingers). If one eye has a cataract, covering the better seeing eye will produce one of several responses in an alert and cooperative infant. There may be either a movement of the head to look around the occluder, or an attempt by the infant to remove the occluder with his hand.

One can not assume that every cataract will be dense enough to

produce a white reflex in the pupillary opening. Successful cataract surgery is now possible in the first months of life. For denser cataracts, there is almost a direct correlation between age at removal and final vision (earlier removal equals better vision).

The most difficult type of amblyopia to detect in infancy is that caused by a focusing problem (refractive error). Most cases result when there is a marked difference in the focusing power of the two eyes. At age four most children can play the "E" game. If every health care facility would routinely check all four year olds with this simple test, refractive amblyopia could be eliminated.

Another method of detection by those unable to do refractions is with an ophthalmoscope. Everyone who has used this instrument is aware of the black (+lenses) and the red (-lenses) numbers on the dial which allow the examiner to change the focal length of the instrument to accommodate for his own and the examinee's refractive error. If the observer notes that a significant (more than two diopters) change is required to see the retinal vessels in one eye as compared to the other eye, a refractive error is probably present. (This assumes the examiner knows his own refractive error, or at least knows

that his own eyes are more or less equal).

The treatment of refractive amblyopia is to prescribe appropriate glasses, and patch the better eye until visual acuity is equal in the two eyes. Again, if the condition is left undetected until age eight, this type of treatment is usually less than 100 per cent successful, and often is of no help whatsoever.

Strabismus

The third major cause of amblyopia in pre-schoolers is that caused by a muscle imbalance (strabismus or squint). The eyes may turn in (esotropia or crossed eyes) or turn out (exotropia). Quite often there is a vertical misalignment in addition to the horizontal deviation. More rarely, there is a vertical imbalance alone. If one eye is constantly straight and the fellow eye deviates, amblyopia will develop. This is secondary to the visual confusion and subsequent cortical suppression which follows when the fovea of each eye is looking at a different object.

The treatment for strabismic amblyopia is the same as for the previous entities. (i.e. full time occlusion of the straight eye until equal vision is obtained). Obviously the underlying cause must also be eliminated or the amblyopia will recur.

In the past fifteen years much

knowledge has been gained about the various types of strabismus. The most important change has occurred in the areas of earlier diagnosis and treatment. We now have proof, from monkey experiments, that certain parts of the occipital cortex and the nerve paths leading to it actually fail to develop if a child is born with strabismus. We no longer "wait until the baby is a little older". When an infant has strabismus (usually esotropia) in the first few months of life, surgery is now performed at four months of age. There is a direct correlation between the development of depth perception and the age at which strabismus is corrected. If surgery is performed at eighteen months of age there is only a 50 per cent chance for binocular vision. This figure increases to a 75 per cent chance when realignment occurs at twelve months of age. In the first year of life, esotropia is sometimes diagnosed when the eyes are actually straight, but do look crossed at times, especially when the child looks right or left (often noted in photographs of the baby). This appearance is most often due to a broad epicanthal fold of skin on either side of the nose. This condition is the only one the parents can safely be told the baby will outgrow. The diagnosis can be confirmed by the

alternate cover test previously mentioned (the eye under the cover will move outward to take up fixation when the occluder is moved to the fellow eye). Any shift in alignment with this test indicates a strabismic problem. Shining a flashlight into a normal infant's eyes will produce a reflection from the corneal surface which is located just nasal to the center of the cornea. This would be true in pseudo-strabismus (broad epicanthal folds), but is not true in squint where the reflex is laterally displaced in esotropia and nasally displaced in exotropia.

Acquired esotropia usually has its onset during the ages of two to four years, but cases have been reported as early as seven months and as late as the grade school years. The diagnosis is again made by the alternate cover test, flashlight test, or gross observation if the angle of deviation is large enough. This condition may be caused by a need for glasses, although eye drops are sometimes used as a substitute. If treatment does not produce satisfactory realignment, surgery must be performed. Amblyopia is a very common finding in an acquired esotropia, but almost unheard of in a congenital esotropia.

Exotropia seems to be different in the way it affects the eye.

It often develops more slowly. The parents may observe it initially only when the child is tired or daydreaming. They may also notice the child rubbing or closing one eye on a bright sunny day. If there is a history of these symptoms from the parent, the examiner may not observe this condition unless the child is told to view an object at least twenty feet away. The alternate cover test should reveal the problem. The first couple of times there may be only a slight shift of the eyes, but as the test continues the binocularity is increasingly taxed and a greater deviation often becomes apparent. Glasses have not produced any significant number of cures, so surgery is performed if suppression has led to amblyopia, or if the child has a deviation which occurs on a daily basis.

Amblyopia and strabismus are conditions detectable by any interested observer who is willing to spend several minutes gaining the child's attention and cooperation. The basic test is the alternate cover test and should be done by everyone who has an interest in or access to the examination of a child's eyes.

Other Problems

There are other less frequent causes of vision problems in pre-schoolers. One is congenital

glaucoma, most often seen in the first year of life. The usual finding is an enlarged cornea, often up to 13 or 14 mm's (normal cornea diameter is about 11 mm's). The three classic symptoms of tearing, sensitivity to sunlight and frequent blinking are enough to prove the diagnosis. After a period of increased pressure within the eye, the eye may turn cloudy (hazy) or appear white. Surgery is the only method known to produce a permanent cure.

Intra-ocular tumors are another rare cause of vision loss in childhood. The retino-blastoma is the most common type and is typically seen between the ages of one and three years. There may be nothing wrong with the eye to the average observer, but a careful look in the pupillary space may reveal a white reflex (very difficult to differentiate from the whiteness of a cataract). The cover test will often produce the same response mentioned earlier in deprivation amblyopia. Surgery is performed in most cases to establish a pathological diagnosis.

Other rare causes of vision problems in pre-schoolers include inflammation, congenital developmental faults and trauma. Again, the hallmark of all these conditions would be poor vision detected during routine screen-

ing by the "E" game or by the alternate cover test.

Refractive Error

Except for trauma, the only problem routinely encountered after age six is the development of a refractive error which leads to a slow (often unobserved by the child) deterioration in visual acuity. Fortunately, glasses usually restore the vision to normal. A very simple test can be performed with a piece of paper or cardboard in which several pin sized holes have been made. The person with a significant refractive error will notice an immediate improvement in vision when looking through the holes, and will be able to read more lines on the Snellen chart.

Myopia is the most common type of refractive error and may be caused by hereditary or environmental factors. Typical of environmentally-caused myopia is that found in the bright child

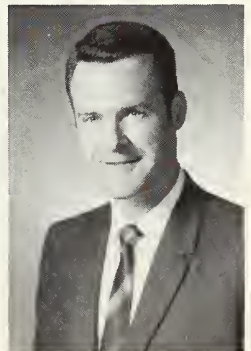
who loves to spend every waking hour of the day reading. Sometimes the progression of the myopia can be prevented by eye drops or by the use of bifocal glasses.

There are many other types of rare visual problems, but the ones described are those most typically encountered by the Pediatric Ophthalmologist. We now know enough about the eyes and the development of normal sight to state that any eye problem, whenever it is detected, should be diagnosed and treated as soon as possible. If a child is allowed to see imperfectly in the early developmental years, he acquires sensory abnormalities that will be his companions for life.

We have it in our power to change this unfortunate sequence of events. Education of parents, teachers, nurses and physicians is the best way to insure the right of every child to perfect sight. ◇◇◇

About the Author. . .

Richard Simmons, M.D., is in the private practice of pediatric ophthalmology in Columbus. He received his Bachelor's degree from the College of Wooster, his M.D. from Western Reserve University and a Master of Science degree in Ophthalmology from Georgetown University, Washington, D.C. where he also completed a fellowship in pediatric ophthalmology at Washington's Children's Hospital. Dr. Simmons is a consultant and examiner for the Diagnostic Ocular Pediatric Clinics, Ohio Department of Health; and an advisor for preschool vision screening, Ohio Society for the Prevention of Blindness.



NOW, LET'S SEE-

Alice Johnson, R.N.

What constitutes a good school vision screening program? In my opinion, the job needs to be done with uniformity, well-trained personnel, cooperation and good rapport between school personnel and screening technicians and a continuing follow-up. Clermont County, which is made up of 9 districts comprising 52 schools plus nursery schools, has this kind of program.

Prior to the spring of 1966, vision screening was performed by school nurses, public health nurses and volunteers. The work was done well but usually involved the whole year, and many

children were missed. Maintaining a continuing follow-up was almost an impossibility. When Dr. William Grimm, Ohio Department of Health, proposed a plan for uniformity in screening, referring and follow-up for all school children, to be financed by the state and serviced by personnel working out of the County Health Department, our Health Commissioner and Board agreed to the pilot program.

In January 1966, a Registered Nurse with some public health knowledge and four other women were hired. They received instructions on the anatomy of the eye, abnormal conditions to be aware of and how to use Snellen equipment. The screening service was then offered to all public and parochial schools. During the months of February through April an attempt was made to complete the testing (Kindergarten thru 12) already initiated by the individual schools (11,784 children screened with 1,618 referrals sent). The program was well received and in September the complete program was instituted.

As supervisor I try to meet with each principal who supplies the dates when it will be convenient for us to be in his



The cover test for eye muscle imbalance.

school. I also schedule the number of technicians needed to complete the initial screening in one day. Our larger schools may require two days, particularly if kindergartens are housed in other buildings. The work sheets, to be made out in duplicate, are left with the principal to be ready with the preliminary information when the technicians return to the school.

With good testing conditions, cooperation from school personnel and a person available to bring the children, each technician can screen approximately 100 little children and 140 older ones in a day. The technicians complete the work sheets which are then returned to the Health Department.

The work sheets are reviewed; those with failing scores and the absentees are picked up on a second visit to the school. These scores are measured against the Ohio Department of Health referral criteria and results of the previous year's follow-up, to determine which cases need further examination. Referral letters are sent from the Health Department to the school and then to the home.

The follow-up sheets identify the children with non-correctable eye conditions who should not be referred and the children who have previously received glasses. When the referral letter is re-

turned it also lists the type of condition the doctor found. All information is relayed to the schools. I feel there is better response from the parent in obtaining a complete eye examination for the child and from the doctor in returning referral letters when they know the program is an on-going service from the Health Department. Last year more than 18,000 were screened; approximately 10 per cent of the children screened were referred and about 60 per cent of the referrals were completed.

As mentioned, the mass screening program was completely financed by the Division of Maternal and Child Health, and this arrangement continued until 1969 when a partial state sub-



Showing prospective screenees how to "read" the "E" chart.

sity was received. Each year, with a growing county and more schools to be serviced, the program was proving its value. All state aid was withdrawn in 1970, but the Board decided to maintain the program.

As with all things there must be change and so it is with the screening. The high school students are no longer tested unless a principal requests it. Most 10th or 11th graders take Driver's Education which requires a vision test. Since 1968 nursery school children have been screened and the number of nursery schools seems to increase yearly.

A beneficial change came about when Richard Bunner, Vision Conservation Unit, ODH, requested a battery of tests on Kindergarten, 1st graders, pre-schoolers and teacher referrals. The additional tests were: plus 2 lens for hyperopia; pen-light or cover test for muscle imbalance;

color blind test on boys; and Snellen for distance. Mr. Bunner and an optometrist gave the necessary instructions, and two years ago these tests were added to the program. The ODH-sponsored DOP Clinic (Diagnostic Ocular Pediatric) also came to Clermont County. The Clinic was another referral route and also a source for examining babies and toddlers with eye problems. Last school year 76 patients were seen in four clinics.

Our school children are getting a necessary service that could not be carried on with such efficiency and good results without the dedicated technicians who really enjoy working with the children; and without the wonderful cooperation received from school personnel and PTA mothers. The Clermont County Vision Screening Program is a joint operation for the benefit of all Clermont County children.

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About the Author. . .

Alice R. Johnson, R.N., is Supervisor, Vision and Hearing Program, Clermont County Health Department. She was graduated from Cambridge City Hospital School of Nursing, Cambridge, Massachusetts, served in the Army Nurse Corps, and has supervised an industrial hospital in Aruba, Netherlands West Indies. She joined the Clermont County Health Department staff in 1963.

WHAT'S A DOP CLINIC ?

Barbara Strangfeld, B.A.

What happens to the six-year-old child who fails his vision screening test at school, with 20/20 in one eye and 20/100 in the other, and has no money for an eye specialist? If he is lucky, his county will have a Diagnostic Ocular Pediatric (DOP) vision clinic. He can be diagnosed at no cost to his parents, and referred for appropriate treatment.

The concept of the Diagnostic Ocular Pediatric Clinic was proposed and endorsed by the Vision Conservation Advisory Committee to the Ohio Department of Health in 1969. In 1970, pilot clinics were established at Woodsfield (Monroe County) and Ironton (Lawrence County). The purpose of the pilot Clinic program was to determine:

- (1) the need for diagnostic service in rural areas of Ohio;

- (2) the ability of health agencies to provide a case finding mechanism for the Clinics; and

- (3) their acceptance by the physicians and optometrists in the local communities. ,

These pilot Clinics proved to

be of benefit to local parents, health departments, schools and local practitioners. A Clinic system was then designed to serve the entire State.

The DOP Clinics are made possible through the efforts of the Maternal and Child Health Division, Ohio Department of Health, which provides equipment and professional staff for the clinic system. The most important aspects of the operation--case finding, referrals and follow-up work--are the responsibilities of the local health departments and their communities. The success or failure of any Clinic hinges upon the hard work and determination of all local people involved.

A team approach to diagnosis is used in the DOP Clinic. Each child is examined by an ophthalmologist, and optometrist and a pediatrician. Clinics are also staffed with public health nurses and a Vision Consultant from the Ohio Department of Health. The extensive equipment used is provided by the Department and is transported by a Vision Consultant to each Clinic location.

The equipment includes everything from a \$2,000.00 slit lamp to a \$1.00 penlight.

Records in triplicate are compiled, consisting of a medical history; and an ophthalmologic, optometric and pediatric report of findings and recommendations. This diagnostic information is used to determine the type of follow-up care needed. Children are referred to area practitioners for their follow-up care whenever possible.

Various resources are available for financial aid to medically indigent families, including the Bureau of Crippled Children's Services, Ohio Department of Health, and such local service organizations as the Lions Clubs.

To select those children who are really in need of service, the Hearing and Vision Conservation Unit has constructed a set of criteria for referral into DOP Clinics.



Taking an incoming patient's history, DOP Clinic.

CRITERIA FOR REFERRAL DIAGNOSTIC OCULAR PEDIATRIC (DOP) CLINICS

Preschool Age Children:

(1) Referral from doctor.

(2) Any child with an obvious strabismus or deviation of eyes, or pathology.

(3) Any child who has a recorded visual acuity of 20/20 in one eye and 20/40 in the other eye, and any child who has a recorded visual acuity poorer than 20/40 in either eye. Indicate the best possible acuity (record acuity with glasses if worn by child).

School-Age Children:

(1) Referral from doctor.

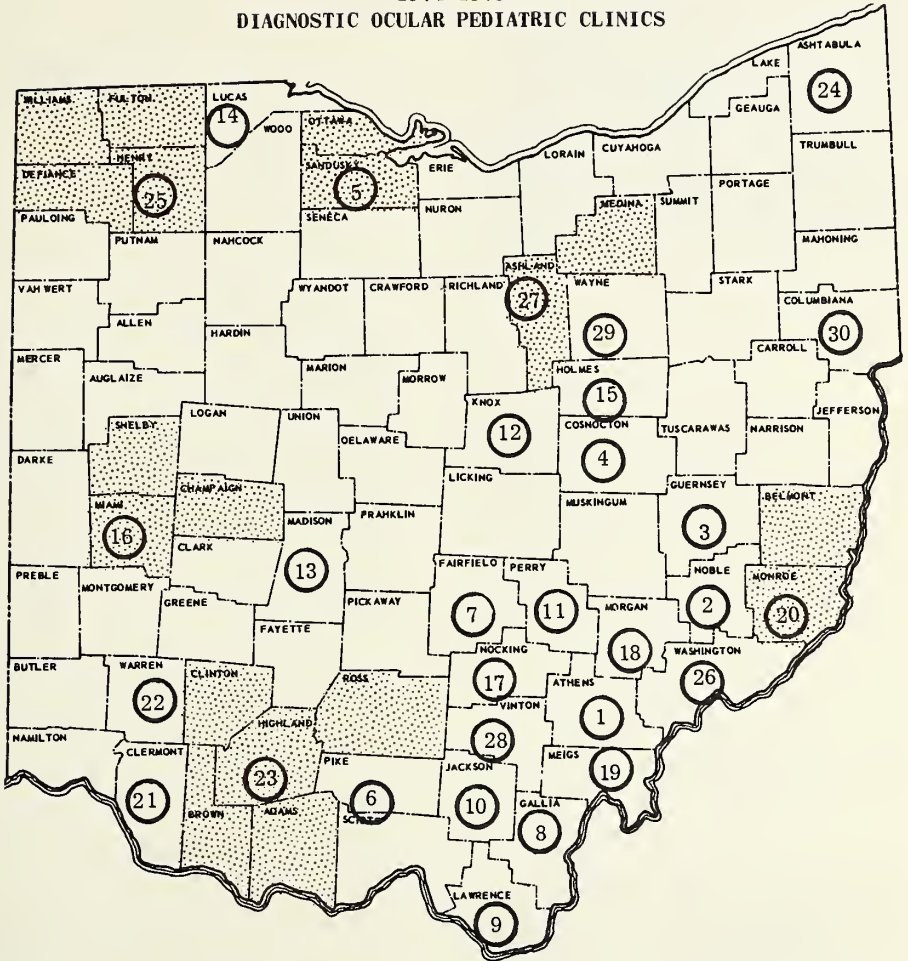
(2) Obvious strabismus or deviation of eyes, or pathology.

(3) Any child whose recorded visual acuity shows a 2-line difference or poorer, and any child with a recorded visual acuity of 20/70 or poorer in either eye. Indicate the best possible acuity (record acuity




Slit lamp examination by the ophthalmologist, DOP Clinic.

1974-1975
DIAGNOSTIC OCULAR PEDIATRIC CLINICS



- | | | | |
|--------------|------------------|-------------------|-------------|
| 1 Athens | 9 Ironton | 17 Logan | 25 Napoleon |
| 2 Caldwell | 10 Jackson | 18 McConnelsville | 26 Marietta |
| 3 Cambridge | 11 New Lexington | 19 Pomeroy | 27 Ashland |
| 4 Coshocton | 12 Mount Vernon | 20 Woodsfield | 28 McArthur |
| 5 Fremont | 13 London | 21 Batavia | 29 Wooster |
| 6 Waverly | 14 Toledo | 22 Lebanon | 30 Lisbon |
| 7 Lancaster | 15 Millersburg | 23 Hillsboro | |
| 8 Gallipolis | 16 Troy | 24 Jefferson | |

 Indicates Multi-County Clinics



Retinoscopy examination by the optometrist, DOP Clinic.

with glasses if worn by child).

The use of selective referrals helps the Hearing and Vision Conservation Unit achieve certain goals. These are to provide:

(1) an added optometric, ophthalmologic and pediatric service where manpower shortages exist;

(2) a system for evaluating health department and school vision screening programs;

(3) a vision education service

to school and public health nurses;

(4) a data collection system on vision problems in children;

(5) an opportunity for joint cooperation between public health, education, optometry, ophthalmology, pediatrics and welfare; and

(6) a direct service to the children of Ohio.

Over the past five years, the DOP Clinic system has grown to 30 Clinic locations serving approximately 40 counties. Approximately 3,000 children have been examined in the past five years, half of them in the past year. DOP Clinics are available to all who seek them, and are placed in counties upon request of the local health department, with approval by the local medical and optometric societies. The Hearing and Vision Conservation Unit looks forward to reaching its long-term goal of servicing the entire State of Ohio. ◇◇◇



About the Author. . .

Barbara Strangfeld, B.A., is a Hearing and Vision Consultant, Hearing and Vision Conservation Unit, Division of Maternal and Child Health, Ohio Department of Health. She received her Bachelor's degree from The Ohio State University.



VISION AND LEARNING

James C. Bieber, O.D.

The normal child gains much of his learning through his vision. When learning does not progress at the anticipated rate, a thorough investigation of the child's vision is indicated.

The vision specialist who works with children with learning problems should understand that the different aspects of vision have varying roles in learning, depending on the age of the child and the academic task under consideration. The child first learning to read is asked to look at relatively well isolated words in large print, and make a visual-verbal match. For him, the ability to sustain visual attention for a long period is not critical. He is a successful reader if he can decode the visual symbols and give the appropriate sounds for which they stand.

The older child has to deal with much smaller print which is presented in paragraphs and pages. The ability to sustain visual attention is very important because the older child reads for content, i.e., comprehension of the author's thoughts.

Whether the child is "learning to read or reading to learn" re-

lates to the visual factors involved. The child learning to read must be able to appreciate visual detail in respect to shape and directionality and then relate this visual input to the proper verbal output. He must develop important visual skills in the realm of perceptual processing, involving visual form perception, spatial relations, directionality, visual memory, and visual-motor coordination.

As the ability to recognize words increases and the child begins to read to gain information, visual functions which might affect the efficiency of reading take on increasing importance. Interference in the free flow of information from the printed page may be caused by problems in visual acuity, refractive error, ocular motility and fixation, convergence, accommodation, and binocular fusion.

Refractive error (nearsightedness, farsightedness, astigmatism) is corrected by lenses if visual acuity or the ease of focus is reduced.

Ocular motility and fixation skills are carefully observed. Smoothness in eye movements is important because reading re-

quires accurate pointing of the eyes at successive word groups and jumping from the end of one line to the beginning of the next.

Inefficient eye-movement control often is responsible for loss of place, missing or confusing small words, and slowness when reading. The child frequently will use his finger or a marker to keep his eyes on target while reading. Eye-movement control usually is improved through simple exercises.

Accommodation (focusing ability) is very important to the reader for it allows him to see clearly at close range. Most young people have adequate accommodation, but sometimes changes in focus are not easily made or sustaining focus is difficult. The presence of farsightedness and the usual close working distance of the child can compound the problem.

Frequently, children with focus-control problems and/or a latent tendency of the eyes to cross at close work will allow their focus to drift significantly beyond the plane of the book while reading (lag of accommodation). Although the child may not be aware of blurring of vision because the print is fairly large, he may have reduced reading efficiency. He may report eye- or headaches when he does attempt to focus

accurately for sustained periods. These focus-control problems can usually be helped through exercises and the use of low-powered convex lenses.

Problems in binocular fusion (blending the pictures seen by each eye into a single image) have been found to correlate to reading inefficiency more than any other problems in visual function. Either having very good coordination between the eyes or being essentially one-eyed apparently are the ideal conditions. A child with two good eyes which tend to misalign occasionally would be expected to have more difficulty with reading than a child whose eye turns in constantly.

Muscle imbalances cause stress on binocular fusion and neuromuscular energy must be used to maintain alignment of the eyes. Frequently the child will pay more attention to the effort of seeing than to comprehending what he is attempting to read. Avoidance of sustained nearwork may be his only escape from discomfort, fatigue, and frustration unless he is given proper treatment with orthoptic exercises, lenses and/or prisms.

Rarely are these visual-function problems responsible for severe learning difficulties, but they may contribute to learning inefficiencies, especially in reading. The

comprehensive vision examination of a child with learning problems should also include an evaluation of his visual-motor development.

The academic areas most likely to be affected by a visual-motor problem are (1) handwriting, which is essentially a visual-motor skill, (2) spelling, which requires good visual-motor memory, (3) mathematics, which requires understanding quantities and spatial relationships, and (4) learning to read, which involves decoding visual symbols and the ability to appreciate visual form and directionality.

Some of the key indicators of visual-motor problems are often reported by teachers or parents who have a chance to observe the child in his daily activities. Although there may be a number of causes for a given behavior, the following symptoms may suggest a lag in visual-motor development:

1. Difficulty buttoning clothes or tying shoes.

2. Avoidance or lack of interest in pencil-and-paper activities.

3. Difficulty cutting neatly with scissors.

4. Poor handwriting.

5. Immature drawings.

6. Improper pencil grasp (too tight or too loose).

7. Confusion or reversal of letters ("b" for "d", etc.) or words ("no" for "on", etc.).

8. Writing neat but laborious.

9. Seeming lack of awareness of lines and borders when writing or coloring.

10. Moving only the fingers when writing.

11. Drawing with short, sketchy lines.

12. Turning paper or body to draw lines in different directions.

These observations must be considered in relation to the child's age, for they are all normal behaviors in the younger child.

In addition to behavioral indications, performance on standardized tests help in the diagnosis of visual-motor problems. These tests, given by the school psychologist, in the clinic or in the specialist's office, usually involve copying designs and may include the following: Bender Visual-Motor Gestalt Test, Rutgers Drawing Test, Gesell Copy Forms, and the Beery Developmental Test of Visual-Motor Integration.

To differentiate between a fine-motor output-control problem and a problem in processing visual input, it is helpful to give the Motor-Free Visual Perception Test. This test includes subtests of visual discrimination, visual figure-ground, visual memory, and visual closure, without requiring movement other than pointing to the chosen

response pattern.

Also of interest, especially with the younger child, is the result of informal testing with parquetry blocks, form boards, puzzles, and handwriting.

Visual-motor problems usually respond well to training. A technique developed at the University of Pittsburgh Learning Research and Development Center has as its core a Design Board Program. The patient starts with concrete, manipulative materials (Geoboard and rubber bands) and works toward more abstract tasks, such as copying designs by drawing. The ultimate goal is to teach a generalized skill in which the child can analyze visual information and produce an accurate motor (graphic) response. Transfer and utilization of the improved visual-motor skills in academic subject areas is the responsibility of educators, and may require tutoring.

When a child is scheduled for examination of his eyes and vision, and evaluation of his

visual-motor perception, it is very helpful to have information ahead of time from the child's teachers and school psychologist.

The results of standardized tests given by the school psychologist are of much interest, especially in the areas of visual-motor development (e.g. Bender), level of achievement (e.g. WRAT), and intelligence (e.g. Stanford-Binet or WISC).

With his understanding of the different aspects of the total visual process in learning, the vision specialist is in a good position to help the child with learning problems. Too often, however, the possible role of seeing ability is minimized or is given only cursory investigation, in which the status of the child's vision is equated to a score on a Snellen visual acuity screening test.

The child who is underachieving in school has already been identified as needing referral by the very fact that he is underachieving. ◇◇◇



About the Author. . .

James C. Bieber, O.D., is in the private practice of optometry, specializing in vision development in children as it relates to learning. He received his Doctor of Optometry degree from The Ohio State University. Dr. Bieber serves as clinical instructor in the Perceptual Development Clinic, College of Optometry, OSU; and as vision consultant for the Ohio Department of Health.

ITINERANT TEACHERS HELP VISUALLY IMPAIRED CHILDREN

Grace Wallingford, B.S.

Visually impaired children in Adams and Highland Counties have been proving for twenty-three years, with the help of the Itinerant Teacher Program, that blind and partially sighted children can advantageously join sighted pupils in the classroom. Many of the graduates have gained outstanding recognition for themselves. One totally blind graduate is now an Associate Professor in Communications at a state university; a legally-blind (ten percent or less normal vision) graduate is a high school guidance counselor. Another graduate with 20 per cent peripheral vision is a successful farmer. Other graduates are now performing such jobs as small engines repair technician, X-ray developing technician, Braille telephone operator, clerk and homemaker.

Three graduates are presently attending college. One of them, totally blind, plans to be a lawyer. The other two, legally blind, are planning careers in Special Education and Clinical Psychology.

Some students do not do very well academically, but their

impaired vision is not necessarily the reason. They perform below average for the same reason other students do.

The Planning

From the beginning certain attitudes and goals have been uppermost in planning the Program:

(1) That visually impaired youngsters can handle regular classrooms in regular schools with considerable benefits to themselves and no special problems for their teachers or their classmates.

(2) That the blind student has a right to attend his own local school if he wishes, just as other students do.

(3) That the visually impaired child can and should be treated like every other student and not as someone special.

(4) That visually impaired students should be encouraged to take charge of their own lives, and their sighted classmates and teachers should be encouraged to give them freedom to do so.

The Program

An Itinerant Teacher travels

from school to school in the two counties, serving from twelve to twenty students in grades Kindergarten to twelve. He serves as a backup for classroom teachers who occasionally need expert help in working with visually impaired children. The Itinerant Teacher provides the students with specially developed materials--large-print books, taped textbooks, magnifiers, raised graph paper, etc.

Each child has his own specific needs. Some require tutoring, some need to learn Braille, others need special materials and aids, and others need only to be understood and liberated. When a student needs to become familiar with the school's physical layout, the Itinerant Teacher traces with the youngster the routes he will take to meet every circumstance during the day.

Some students need a little help to persuade a resistant teacher that the visually impaired student can participate in such activities as gym classes, shop, home economics, science labs or the marching band without risking injury. Many teachers and administrators, through a combination of compassion and unawareness, become over-protective. They underrate the abilities of

these youngsters to fend for themselves, and overlook the need to encourage them to do so.

The Itinerant Teacher works with volunteers who devote large amounts of time to typing large-print and Braille textbooks and taping textbooks, the student's most important tools. The teacher works closely with the Department of Health, DOP Clinics and school nurses to obtain the best eye care possible for the visually impaired children. Social services work with the youngster and his parents, making sure he knows what rehabilitation services are available to him.

Some school officials are apprehensive about having a visually impaired student attend regular classes. They usually overcome their apprehensions when they see how well such a student can adapt, and agree that such students should not be kept from the mainstream of life.

The experience is a two-way street. Visually impaired students get an invaluable start in developing self-reliance and self-sufficiency, and their sighted classmates get a new understanding of blind people and a new appreciation of their capabilities. ◇◇◇

About the Author. . .

Grace Wallingford, B.S., is the Itinerant Teacher for visually impaired children attending public schools in Adams and Highland Counties, a position she has held for twenty years. She received her Bachelor of Science in Elementary Education from Manchester College, North Manchester, Indiana, and completed graduate studies in Special Education at Syracuse University and The Ohio State University. Ms. Wallingford serves as co-ordinator for the DOP clinics in a four-county area.



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REHABILITATING THE BLIND CHILD

Richard W. Schuricht, M. Ed.

The habilitation or rehabilitation of a blind child is most effective if services to the child begin at an early age. Unlike children with other disabling conditions, visually impaired children have not been the recipients of wide-spread foundation or association support. For this reason, the Ohio Rehabilitation Services Commission, through its Bureau of Services for the Blind, maintains a Children's Services Unit. The Unit is staffed by seven consultants located throughout the state, and a program specialist in the Bureau's central office.

The age range of children served is birth to 16 years. At present, nearly 1,540 legally blind children are known to the Unit. Statistical estimates indicate that another 400 to 500 legally blind children, as well as some 3,000 visually impaired children who are also eligible for services, are still not reported.

Other than age, the eligibility requirements for services from the Children's Services Unit are minimal. Any child in Ohio is eligible if he meets the accepted definitions of visual impairment or legal blindness as

established by the Bureau of Services for the Blind. Verification of the visual problem by a licensed physician is required. When the child reaches sixteen, the Children's Unit program will terminate, and the client will be referred to an appropriate agency.

When a child becomes known to a consultant, he is eligible for a diversity of services, according to individual need. Since the Unit functions without case services funds, or the ability to purchase services, everything offered must be on a personal basis.

The consultant's duties can be divided into four areas:

- First, he participates in a comprehensive social and habilitative services program directly with the child. These services include personal involvement through counseling or discussion, individual training in such areas as body awareness, concept development, spatial relationships, motor skills, personal skills, and resource location.

- Interaction with parents is second. This includes counseling to help the family understand and adjust to the visually im-

paired child. Instruction is given in the home on specific methods to use with the child and on the location of community resources which could benefit the family. The understanding and knowledge which the consultant brings to the parents is very important, and frequently necessary for parental acceptance of the child and for the child's integration into the family unit. Parents can learn and implement the techniques and methods of working with the child which contribute to his normal developmental sequence. More normal development in the areas of body awareness, spatial and other concepts, psycho-motor skills and personal skills invariably lead to a more capable adult.

● Third, the consultant can assist other professional individuals, groups or agencies that deal with children. Such interaction leads to a better understanding of the problems of the visually impaired child. It also demonstrates how the professional

from another area can effectively aid the child's development.

● Finally, all the consultants are involved in public relations, speaking engagements, case finding and the general development of resources in their respective communities.

In addition to the individualized services provided, various seminars and workshops are conducted, statewide and locally. These are usually interdisciplinary meetings designed to acquaint the parents with different, yet effective, methods of working with their children. Parents get the opportunity to discuss problems with others who have similar problems. The meetings are used as a forum for alerting the parents to their rights and responsibilities and to the rights and responsibilities of their children.

The Children's Services Unit is available, and able, to help visually impaired children prepare for full, productive lives.

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About the Author. . .

Richard W. Schuricht, B.A., M.Ed., is Program Specialist for Children's Services, Ohio Bureau of Services for the Blind. He also serves as Director, Orientation and Mobility Program, Vision Center, Columbus. Mr. Schuricht received his Bachelor's and Master's degrees at the University of Pittsburgh, where he studied an additional year in Orientation and Mobility Training. He has taught and counseled in several Pennsylvania communities.



VISION LEAGUE OF OHIO

Nicholas Parthenakis, B.S., O.D.

The Vision League of Ohio was incorporated in 1965 as a non-profit organization to preserve and advance the visual welfare of the people of Ohio. To accomplish these ends, the V.L.O. works through the mediums of public service, public relations and legislation.

The League has seven main goals:

- To study, analyze, and disseminate statistical, scientific and other information on all social, economic and legal phases of public vision care.
- To work toward the inclusion of better vision care in industrial and governmental plans.
- To preserve and protect the best interests of the public and cooperate with qualified agencies concerned with the preservation of visual health.
- To preserve freedom of choice of practitioner and of patient.
- To alert and inform public officials and officials-to-be in matters pertaining to vision.
- To encourage the enactment of laws, ordinances and regulations to protect the public and improve vision care.
- To promote research in vision care.

Projects sponsored by the V.L.O. to achieve these goals include educating parents about dangerous toys which may injure and cause blindness; developing a slide presentation on "Motorists' Vision and Highway Safety"; distributing "Wise Owl" book-marks free to public libraries; preparing informational pamphlets; conducting amblyopia screenings; producing radio spot announcements on proper vision care; and organizing Industrial Vision Forums to promote the importance of good vision in industry.

The Vision League has an active Speakers' Bureau, able to furnish speakers on fifteen vision related topics. History of Eye Care, Physiology of Vision for the Elementary School Level, Perceptual Problems of Children, Industrial and Traffic-related Vision Problems, Childrens' and Geriatric Vision Care are some of the topics available.

A seven page semi-annual newsletter, "Communi-Vision", is published by the Vision League. The Summer 1974 issue discussed "Pediatric Vision Problems". Vision screening is an important, often misunderstood factor in

today's educational structure. Some children with major vision deficits may pass successfully many of the screening techniques currently in use. A review of vision screening programs shows that the best programs entail the modified clinical technique which utilizes the services of vision specialists. Referral accuracy is high and cost is relatively low.

The Winter, 1974, issue of "Communi-Vision" dealt with "Industrial Vision Care". Of all man's physiological functions, none is as directly linked to his safety, efficiency, and productivity as is his eyesight. But of all the major body organs prone to occupational injuries, the eye is perhaps the most vulnerable. Recent events have had a considerable impact upon industrial vision. The Occupational Safety and Health Act of 1970 (OSHA) broadened the responsibility of management, both in increased costs of operation and in interpretation and implementation of the law.

Under the co-sponsorship of the V.L.O., a ten foot diameter Walk-In Eye will be on display at the Center of Science and Industry in Columbus some time this year. The giant eyeball will duplicate in detail the structures of the eye, with each part made of different textures so that low vision and blind persons may distinguish the parts by touch. A wheelchair ramp has been constructed in the eyeball. The Walk-In Eyeball is portable, and eventually will be displayed in other areas of Ohio.

Membership in the Vision League is open to all citizens of Ohio and every V.L.O. member has a voice in the functioning of the organization. The annual meeting is held in May, and the dues are minimal. Each member receives the "Communi-Vision" and any other available literature. For more information, write the Vision League of Ohio, 2094 Tremont Center, Suite 6, Columbus, Ohio 43221; or call (614) 486-0354. ◇◇◇

About the Author. . .

Nicholas G. Parthenakis, B.S., O.D., is in the private practice of optometry in Mt. Healthy, a suburb of Cincinnati. He attended the University of Cincinnati, and earned his Doctor of Optometry degree from The Ohio State University. Dr. Parthenakis is the editor of "Communi-Vision", published by the Vision League of Ohio; vice president of the all-volunteer Cincinnati Optometric Center; and chairman of the board of the Occupational Vision Consultants.

SCREENING FOR PRESCHOOLERS

Elaine Greten, B.A., M.A.

Preschoolers Lynn Hall, Norma King and Michael Hamler are seeing their world in clear focus today because their vision was checked for defects before they started school.

Lynn and Michael had their eyes checked at a free preschool vision screening co-sponsored by the Ohio Society for the Prevention of Blindness (OSPB) with a volunteer group. Each was discovered to be the victim of amblyopia, or "lazy eye". Each child now sees normally with only glasses, but it took months of "patching" of the stronger eye to force the weaker--or "lazy eye"--to work.

Norma's mother sent for a free Home Eye Test for Preschoolers which the Ohio Society supplies for checking a child's vision at home. The mother discovered that Norma could not see as well as she should, and had her eyes examined professionally. Norma was found to have astigmatism, and glasses corrected her vision problem.

According to Mrs. Virginia Benton, OSPB Executive Director, "These free preschool vision screenings and the Home Eye Test are the best methods we have found to help parents discover vision defects in preschool age

children."

"It's very important for any vision defects to be discovered and treatment begun before a child reaches school age," Mrs. Benton added, "because you can't teach an old dog new tricks, and the human eye has become an 'old dog' by the age of seven."

Lynn Hall and Michael Hamler are typical of the children referred to eye specialists following a preschool vision screening. When Lynn was checked, she had 20/25 vision in one eye and 20/200 in the other. Normal vision is 20/20 in each eye. After wearing a patch over her good right eye fulltime for seven months and parttime for another 11 months, Lynn now sees 20/25 with her glasses.

"Mommy, everything looked melted until I got my glasses," said Michael when he had been fitted with glasses and an eye patch after a preschool screening had indicated a vision problem.

Michael's mother had had his eyes checked when he was three and they were normal. Three years later, when he was referred from the vision screening, an eye specialist said Michael had little more than 50 per cent vision

in one eye and only 35 per cent in the other.

How much Michael's vision could be improved was uncertain, since he was almost seven. The doctor and Michael's parents were amazed when his vision was corrected in only seven weeks of patching. His eyesight is now 20/30 even without the glasses he usually wears.

Michael's mother became a volunteer screener in a Society-sponsored vision screening program. As she said, "If we can save the sight of only one child, all our time and effort will be worth it." Mothers such as Mrs. Hamler are the core of the Society's programs.

"We stress to parents that they can't always tell whether their child has a vision problem," Mrs. Benton said. "A child does not know how well he sees. If his vision has always been out of focus, he has no way of knowing that his world should be seen in clear detail, and so he doesn't tell his parents."

The Ohio Society for the Prevention of Blindness last year helped volunteer groups throughout Ohio conduct free preschool vision screenings which reached 25,000 children.

The Society coordinates the projects, trains volunteers, and provides support literature at no cost. In return, volunteer groups provide complete statis-

tics from the screenings and follow-ups on children referred to eye specialists, to make sure they have their eyes checked by professionals. The statistics are sent to the National Society for the Prevention of Blindness, for a continuing study of blindness in the United States.

"Among children aged three to six, one in every twenty has a vision problem," Mrs. Benton said. "Our records show that approximately one fifth of that number have amblyopia. It's very disheartening to see parents ignore their child's vision when we know that half of all blindness can be prevented."

Although the main purpose of the preschool vision screenings is to detect vision problems, such a program also serves to educate the parents to the need for continuous interest in personal and community eye health and safety.

Home Eye Test for Preschoolers

Produced and distributed
by the National Society for
the Prevention of Blindness.
A Reader's Digest Public
Service Project.

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Many times a program will discover one or more children who cannot respond in a mass screening. In these cases, the mother is given the Society's Home Eye Test for Preschoolers. The small printed pamphlet contains all the supplies needed to check the child's vision at home. More than 150,000 Home Eye Tests were distributed last year through screening programs or in answer to direct mail requests from parents, nurses and schools.

Both the preschool vision screenings and the Home Eye Test are made possible by funds contributed by the general public to the Society. The Ohio Society

for the Prevention of Blindness is an affiliate of the National Society.

The National Society for the Prevention of Blindness, founded in 1908, is the second oldest voluntary health organization in the country and the only organization devoted solely to blindness prevention.

Five-year-old Norma King's mother asked her how she would like to see her world without glasses. She said, "No way!" Norma speaks for all those who have benefitted from the preschool vision programs of the Ohio Society for the Prevention of Blindness. ◇◇



Will the eye patch cure Dolly's amblyopia, too?



Five-year-old Norma King shows her mother, Mrs. Roger King, how to take the "E" test.



Point Up



Point Down



Point This Way



Point That Way

About the Author. . .

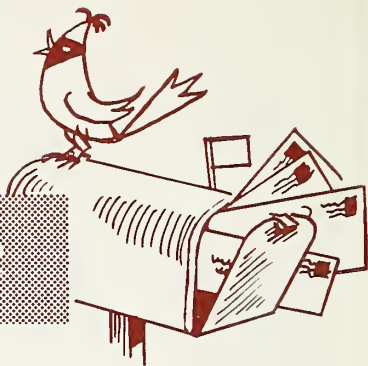
Elaine Greten, B.A., M.A., is Education-Program Coordinator, Ohio Society for the Prevention of Blindness. She earned her Bachelor's degree from Muskingum College and her Master's in journalism from The Ohio State University. Ms. Greten has taught in Coshocton County schools and written for the Coshocton Tribune.



NISSUE
NEXT

Adult Vision

LETTERS TO THE EDITOR



Editor, Ohio's Health:

Today I received my May issue of Ohio's Health ("Retirement With Involvement"), and have just now finished reading it from cover to cover!

I enjoyed every article, but must make particular mention of the one by Mr. Edwin Smith...Mr. Smith makes mention of a quote by a sage, but I must say that he should surely qualify as one himself.

...After reading this issue I wonder if it is ever too early to make plans for retirement?...

Cordially yours,

Jim Penkala
Loma Linda University, California

FINAL PASTE-UP



(From "Thrust", Sept. 30, 1974)

A Dayton firm is perfecting a nonlethal law enforcement weapon that will put people to sleep.

The Springhart Corp., its creator, has not released full details of how the 4½ ounce weapon will operate. It has indicated that the sonic instrument will cause momentary

sleep through a "synthetic threat" to the body's electrical structure.

The weapon, according to corporation spokesmen, would have a 30-foot range, dazing everything within a 45-degree angle of its discharge for approximately 5 minutes... ◇◇◇



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